

REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)					APPROVED			
A	Add one vendor, CAGE 01295. Add packages C-2 and F-2. Change CAGE 07263 to 27014. Make changes 1.2.2, 1.3, figure 2, and figure 3. Make changes to table I and table II.										88-12-07					M. A. Frye			
B	Add device type 02. Change table I. Editorial changes throughout.										92-11-30					M. A. Frye			
THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED																			
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REV STATUS OF SHEETS				REV		B	B	B	B	B	B	B	B	B	B				
				SHEET		1	2	3	4	5	6	7	8	9	10				
PMIC N/A				PREPARED BY Rick Officer						DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444									
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A				CHECKED BY William J. Johnson															
				APPROVED BY Michael A. Frye															
				DRAWING APPROVAL DATE 87-09-09															
				REVISION LEVEL B						SIZE A	CAGE CODE 67268		5962-87547						
						SHEET		1		OF		10							

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

<u>5962-87547</u>	<u>01</u>	<u>C</u>	<u>X</u>
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	55110A	Dual line driver, 12 mA
02	55109A	Dual line driver, 6 mA

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
D	GDFP1-F14 or CDFP2-F14	14	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

1.2.3 Lead finish. The lead finish shall be as specified in MIL-M-38510. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Supply voltage to ground (V_{CC})	± 7.0 V dc
Input voltage to ground (V_I)	5.5 V dc
Output voltage (V_O)	-5.0 V dc to +12 V dc
Internal power dissipation (P_D)	400 mW ^{1/}
Storage temperature range	-65° C to +150° C
Lead temperature (soldering, 60 seconds):	
Cases C and D	+300° C
Case 2	+260° C
Thermal resistance, junction-to-case (θ_{JC}):	
Cases C, D, and 2	See MIL-STD-1835
Junction temperature (T_J)	+150° C

1.4 Recommended operating conditions. ^{2/}

Supply voltage (V_{CC}):	
For group A, subgroups 1 and 2	± 4.5 V dc to ± 5.5 V dc
For group A, subgroup 3	± 4.75 V dc to ± 5.5 V dc
Positive common mode voltage (V_{CM+})	0 V dc to 10 V dc
Negative common mode voltage (V_{CM-})	-3.0 V dc to 0 V dc
Ambient operating temperature range (T_A)	-55° C to +125° C

^{1/} Above $T_A = 25^\circ\text{C}$, cases 2 and C derate at 11.0 mW/ $^\circ\text{C}$ and case D derate at 8.0 mW/ $^\circ\text{C}$.

^{2/} When using only one channel, the other channel should be inhibited and/or have its outputs grounded.

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standards, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.3 Truth table(s). The truth table(s) shall be as specified on figure 2.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-EC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-EC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Input voltage high	V_{IH}	$\pm 4.5\text{ V} \leq V_{CC} \leq \pm 5.5\text{ V}$	1, 2	All	2.0		V
		$\pm 4.75\text{ V} \leq V_{CC} \leq \pm 5.5\text{ V}$	3				
Input voltage low	V_{IL}	$\pm 4.5\text{ V} \leq V_{CC} \leq \pm 5.5\text{ V}$	1, 2	All		0.8	V
		$\pm 4.75\text{ V} \leq V_{CC} \leq \pm 5.5\text{ V}$	3				
Input clamp voltage <u>1</u> /	V_{IC}	$V_{CC} = \pm 4.5\text{ V}$, $I_I = -12\text{ mA}$ $T_A = +25^{\circ}\text{C}$	1	All		-1.5	V
On-state output current	$I_{O(ON)}$	$V_{CC} = \pm 5.5\text{ V}$, $V_O = 10\text{ V}$	1, 2, 3	01		15	mA
				02		7	
		$V_{CC} = \pm 4.5\text{ V}$, $V_O = -3.0\text{ V}$	1, 2	01	6.5		
				02	3.5		
		$V_{CC} = \pm 4.75\text{ V}$, $V_O = -3.0\text{ V}$	3	01	6.5		
				02	3.5		
Off-state output current	$I_{O(OFF)}$	$V_{CC} = \pm 4.5\text{ V}$, $V_O = 10\text{ V}$	1, 2	All		100	μA
		$V_{CC} = \pm 4.75\text{ V}$, $V_O = 10\text{ V}$	3				
Input current at maximum input voltage	I_I	$V_{CC} = \pm 5.5\text{ V}$ $V_I = 5.5\text{ V}$	A, B, or C inputs	All		1.0	mA
			D input			2.0	

See footnote at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55° C ≤ T _A ≤ +125° C unless otherwise specified		Group A subgroups	Device type	Limits		Unit
						Min	Max	
Input current high	I _{IH}	V _{CC} = ±5.5 V V _I = 2.4 V	A, B, or C inputs	1, 2, 3	All		40	μA
			D input				80	
Input current low	I _{IL}	V _{CC} = ±5.5 V V _I = 0.4 V	A, B, or C inputs	1, 2, 3	All	-3.0		mA
			D input			-6.0		
Positive supply current from V+ with driver enabled	I+(ON)	V _{CC} = ±5.5 V, A and B inputs at 0.4 V, C and D inputs at 2.0 V	1, 2, 3	01		35	mA	
				02		30		
Negative supply current from V- with driver enabled	I-(ON)	V _{CC} = ±5.5 V, A and B inputs at 0.4 V, C and D inputs at 2.0 V	1, 2, 3	01	-50		mA	
				02	-30			
Propagation delay time, A or B to Y or Z	t _{PLH1}	V _{CC} = ±5.0 V, R _L = 50Ω C _L = 40 pF, See figure 3 T _A = +25° C	9	All		15	ns	
			10, 11			20		
	t _{PHL1}		9	All		15		
			10, 11			20		
Propagation delay time, C or D to Y or Z	t _{PLH2}	V _{CC} = ±5.0 V, R _L = 50Ω C _L = 40 pF, See figure 3 T _A = +25° C	9	All		25	ns	
			10, 11			30		
	t _{PHL2}		9	All		25		
			10, 11			30		

1/ Guaranteed, if not tested.

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Devices types	01 and 02	
Case outlines	C and D	2
Terminal number	Terminal symbols	
1	IN A1	NC
2	<u>IN</u> B1	IN A1
3	<u>INH</u> C1	<u>IN</u> B1
4	INH C2	INH C1
5	IN A2	<u>NC</u>
6	IN B2	INH C2
7	GND	NC
8	OUT Y2	IN A2
9	<u>OUT</u> Z2	IN B2
10	INH D	GND
11	V _{CC} ⁻	NC
12	OUT Z1	OUT Y2
13	OUT Y1	<u>OUT</u> Z2
14	V _{CC} ⁺	INH D
15	---	NC
16	---	V _{CC} ⁻
17	---	NC
18	---	OUT Z1
19	---	OUT Y1
20	---	V _{CC} ⁺

NC = no connection

FIGURE 1. Terminal connections.

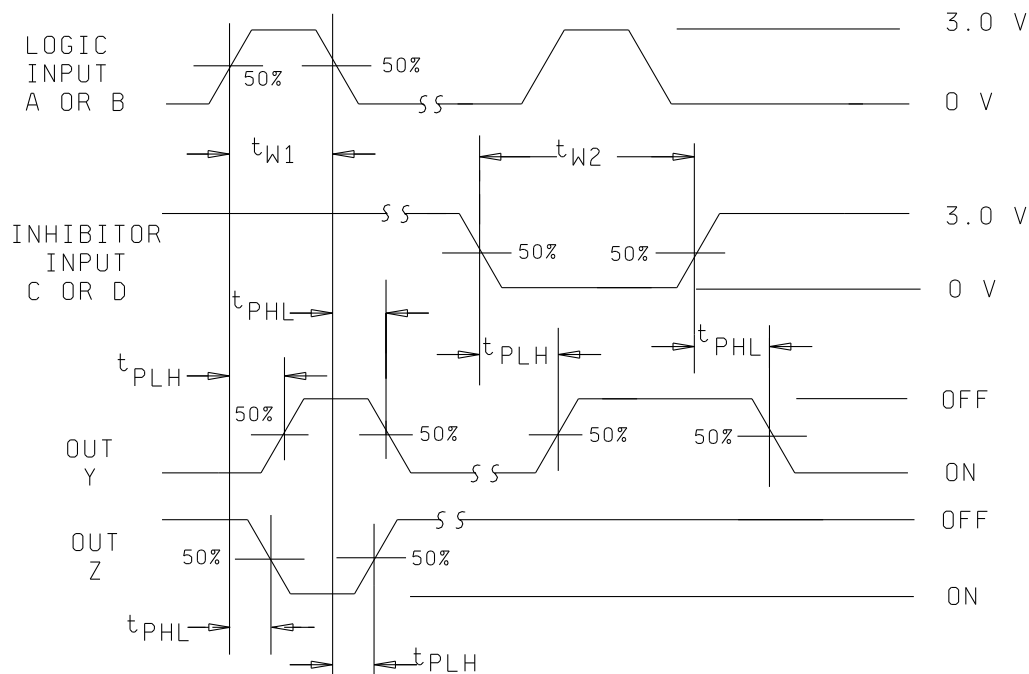
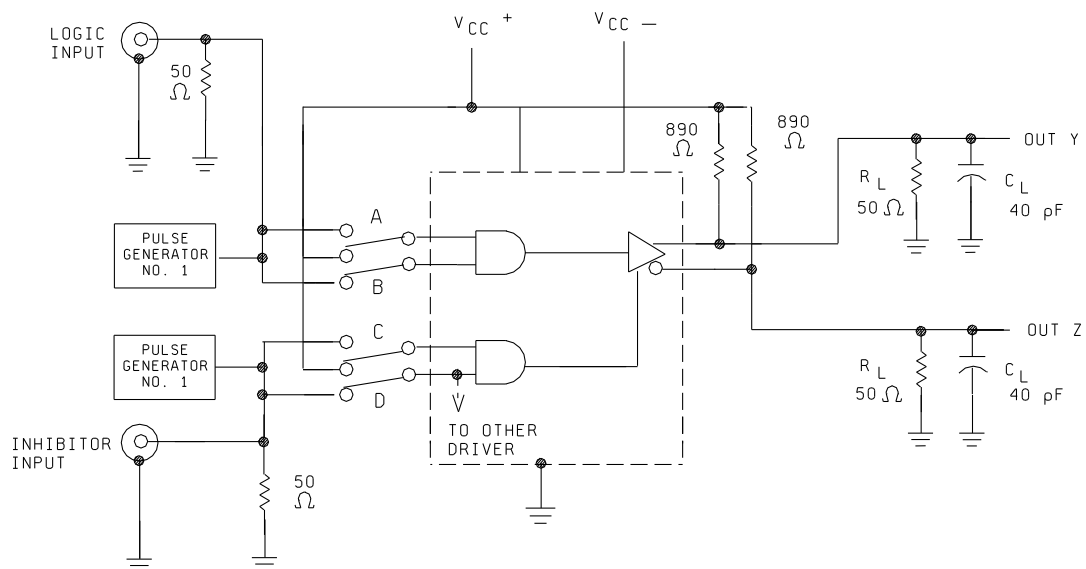
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INPUTS				OUTPUTS	
LOGIC		INHIBITOR			
IN A	IN B	TNH C	TNH D	OUT Y	OUT Z
X	X	L	X	OFF	OFF
X	X	X	L	OFF	OFF
L	X	H	H	ON	OFF
X	L	H	H	ON	OFF
H	H	H	H	OFF	ON

H = High
 L = Low
 X = Don't care

FIGURE 2. Truth table.

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NOTES:

1. The pulse generators have the following characteristics:
 $t_r = t_f = 10 \pm 5.0 \text{ ns}$, $t_{W1} = 500 \text{ ns}$, $\text{PRR} \leq 1.0 \text{ MHz}$,
 $t_{W2} = 1.0 \mu\text{s}$, $\text{PRR} \leq 500 \text{ kHz}$, $Z_0 = 50 \Omega$.
2. C_L includes probe and jig capacitance.
3. For simplicity, only one channel and the inhibitor connections are shown.

FIGURE 3. Switching times test circuit and waveforms.

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3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
 - (2) $T_A = +125^\circ\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 4, 5, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroups 7 and 8 shall include verification of the truth table.

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
 - (2) $T_A = +125^\circ\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

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TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 8, 9
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1

* PDA applies to subgroup 1.

** Subgroups 10 and 11 are guaranteed if not tested.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for original equipment manufacturer application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-EC.

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STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-11-30

Approved sources of supply for SMD 5962-87547 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-EC. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN <u>1/</u>
5962-8754701CX	01295 27014	SNJ55110AJ μA55110ADMQM
5962-8754701DX	01295	SNJ55110AW
5962-87547012X	01295	SNJ55110AFK
5962-8754702CX	01295	SNJ55109AJ
5962-8754702DX	01295	SNJ55109AW
5962-87547022X	01295	SNJ55109AFK

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

01295

27014

Vendor name
and address

Texas Instruments
P.O. Box 6448
Midland, TX 79711

National Semiconductor
2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090

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